

CLAIMS

What is Claimed is:

1. A protective layer for protecting a part against corrosion and oxidation at high temperatures, comprising a MCrAlY alloy having alloying constituents essentially consisting of:
15% to 35% chromium by weight;
7% to 18% aluminum by weight;
0% to 20% rhenium by weight; and
24% to 26% cobalt by weight, wherein M represents the cobalt and at least one of Fe and Ni, and Y represents at least one of yttrium and at least one equivalent element selected from the group consisting of scandium and rare earths.
2. The protective layer of claim 1, wherein:
the chromium content is 15% to 21% by weight,
the aluminum content is 9% to 11.5% by weight,
the rhenium content is 0.5% to 2% by weight, and
a content of the at least one of yttrium and at least one equivalent element selected from the group consisting of scandium and rare earths is 0.05% to 0.7% by weight.
3. The protective layer of claim 2, wherein:
the chromium content is 17% by weight,
the aluminum content is 10% by weight,
the rhenium content is 1.5% by weight, and
the content of the at least one of yttrium and at least one equivalent element selected from the group consisting of scandium and rare earths is 0.3% by weight.
4. The protective layer of claim 1, wherein the MCrAlY alloy protective layer comprises:
an inner MCrAlY alloy layer which faces the part; and
an outer MCrAlY alloy layer which is predominantly in a γ -phase.
5. The protective layer of claim 1, wherein the part is a component for a gas turbine.

6. A protective layer for protecting a part against corrosion and oxidation at high temperatures, comprising a MCrAlY alloy having a predominantly γ -phase in an outer portion thereof, wherein M represents approximately 24% to 26% cobalt by weight and at least one of Fe and Ni, and Y represents at least one of yttrium and at least one equivalent element selected from the group consisting of scandium and rare earths.

7. The protective layer of claim 6, wherein the MCrAlY alloy protective layer comprises:

an inner MCrAlY alloy layer which faces the part; and

an outer MCrAlY alloy layer, the outer MCrAlY alloy layer being the outer portion of the protective layer having the predominantly γ -phase.

8. The protective layer of claim 7, wherein:

the outer MCrAlY alloy layer is a free surface portion of the inner MCrAlY alloy layer, and

the free surface portion is a layer re-melted by at least one of electron beams and ion beams.

9. The protective layer of claim 7, wherein the outer MCrAlY alloy layer is an

electrodeposited MCrAlY alloy predominately in the γ -phase.

10. The protective layer of claim 6, wherein the MCrAlY alloy includes zirconium.

11. The protective layer of claim 6, wherein the MCrAlY alloy includes alloying

constituents essentially consisting of:

15% to 35% chromium by weight,

7% to 18% aluminum by weight,

0% to 20% rhenium by weight, and

24% to 26% cobalt by weight.

12. The protective layer of claim 11, wherein:

the chromium content is 15% to 21% by weight,

the aluminum content is 9% to 11.5% by weight,

the rhenium content is 0.5% to 2% by weight, and

a content of the at least one of yttrium and at least one equivalent element selected from the group consisting of scandium and rare earths is 0.05% to 0.7% by weight.

13. The protective layer of claim 12, wherein:
the chromium content is 17% by weight,
the aluminum content is 10% by weight,
the rhenium content is 1.5% by weight, and
the content of the at least one of yttrium and at least one equivalent element selected from the group consisting of scandium and rare earths is 0.3% by weight.

14. The protective layer of claim 6, wherein the part is a component for a gas turbine.

15. The protective layer of claim 6, wherein the outer portion of the protective layer is almost entirely in the γ -phase.

16. A protective layer for protecting a component against corrosion and oxidation at high temperatures, essentially consisting of:
15% to 21% by weight of chromium;
9% to 11.5% by weight of aluminum;
0% to 2 % by weight of rhenium;
24% to 26% by weight of cobalt;
0.05% to 0.7% by weight of an element selected from the group consisting of yttrium, scandium and rare earths;
0% to 1% by weight of ruthenium;
a remainder being nickel; and
production-related impurities.

17. The protective layer of claim 16, wherein:
the chromium content is 17% by weight,
the aluminum content is 10% by weight,
the rhenium content is 1.5% by weight, and

a content of the element selected from the group consisting of yttrium, scandium and rare earths is 0.3% by weight, it being possible for the contents listed to fluctuate in a manner customary in industrial production.

18. The protective layer of claim 16, wherein the protective layer contains so few chromium-rhenium precipitations that there is no significant embrittlement of the protective layer.

19. The protective layer of claim 18, wherein a volume of the chromium-rhenium precipitations is at most 6% by volume.

20. A protective layer for protecting a part against corrosion and oxidation at high temperatures, comprising a MCrAlY alloy having alloying constituents essentially consisting of:
15% to 35% chromium by weight;
7% to 18% aluminum by weight; and
0% to 20% rhenium by weight, wherein M represents at least one of Fe, Ni and Co, and Y represents at least one of yttrium and at least one equivalent element selected from the group consisting of scandium and rare earths.

21. The protective layer of claim 20, wherein:
the chromium content is 15% to 21% by weight,
the aluminum content is 9% to 11.5% by weight,
the rhenium content is 0.5% to 2% by weight, and
a content of the at least one of yttrium and at least one equivalent element selected from the group consisting of scandium and rare earths is 0.05% to 0.7% by weight.

22. The protective layer of claim 21, wherein:
the chromium content is 17% by weight,
the aluminum content is 10% by weight,
the rhenium content is 1.5% by weight, and
the content of the at least one of yttrium and at least one equivalent element selected from the group consisting of scandium and rare earths is 0.3% by weight.

23. The protective layer of claim 20, wherein the MCrAlY alloy protective layer comprises:

- an inner MCrAlY alloy layer which faces the part; and
- an outer MCrAlY alloy layer which is predominantly in a γ -phase.

24. The protective layer of claim 20, wherein the part is a component for a gas turbine.

25. A protective layer for protecting a part against corrosion and oxidation at high temperatures, comprising a MCrAlY alloy having a predominantly γ -phase in an outer portion thereof, wherein M represents at least one of Fe, Ni and Co, and Y represents at least one of yttrium and at least one equivalent element selected from the group consisting of scandium and rare earths.

26. The protective layer of claim 25, wherein the MCrAlY alloy protective layer comprises:
an inner MCrAlY alloy layer which faces the part; and
an outer MCrAlY alloy layer, the outer MCrAlY alloy layer being the outer portion of the protective layer having the predominantly γ -phase.

27. The protective layer of claim 26, wherein:
the outer MCrAlY alloy layer is a free surface portion of the inner MCrAlY alloy layer, and
the free surface portion is a layer re-melted by at least one of electron beams and ion beams.

28. The protective layer of claim 26, wherein the outer MCrAlY alloy layer is an electrodeposited MCrAlY alloy predominately in the γ -phase.

29. The protective layer of claim 25, wherein the MCrAlY alloy includes zirconium.

30. The protective layer of claim 25, wherein the MCrAlY alloy includes alloying constituents essentially consisting of:

- 15% to 35% chromium by weight,

7% to 18% aluminum by weight, and
0% to 20% rhenium by weight.

31. The protective layer of claim 30, wherein:
the chromium content is 15% to 21% by weight,
the aluminum content is 9% to 11.5% by weight,
the rhenium content is 0.5% to 2% by weight, and
a content of the at least one of yttrium and at least one equivalent element selected from
the group consisting of scandium and rare earths is 0.05% to 0.7% by weight.

32. The protective layer of claim 31, wherein:
the chromium content is 17% by weight,
the aluminum content is 10% by weight,
the rhenium content is 1.5% by weight, and
the content of the at least one of yttrium and at least one equivalent element selected
from the group consisting of scandium and rare earths is 0.3% by weight.

33. The protective layer of claim 25, wherein the part is a component for a gas
turbine.

34. The protective layer of claim 25, wherein the outer portion of the protective layer
is almost entirely in the γ -phase.

35. A protective layer for protecting a component against corrosion and oxidation at
high temperatures, essentially consisting of:
15% to 21% by weight of chromium;
9% to 11.5% by weight of aluminum;
0% to 2 % by weight of rhenium;
0.05% to 0.7% by weight of an element selected from the group consisting of yttrium,
scandium and rare earths;
0% to 1% by weight of ruthenium;
a remainder selected from the group consisting of cobalt and nickel; and

production-related impurities.

36. The protective layer of claim 35, wherein:
the chromium content is 17% by weight,
the aluminum content is 10% by weight,
the rhenium content is 1.5% by weight, and
a content of the element selected from the group consisting of yttrium, scandium and rare earths is 0.3% by weight, it being possible for the contents listed to fluctuate in a manner customary in industrial production.

37. The protective layer of claim 35, wherein the protective layer contains so few chromium-rhenium precipitations that there is no significant embrittlement of the protective layer.

38. The protective layer of claim 37, wherein a volume of the chromium-rhenium precipitations is at most 6% by volume.